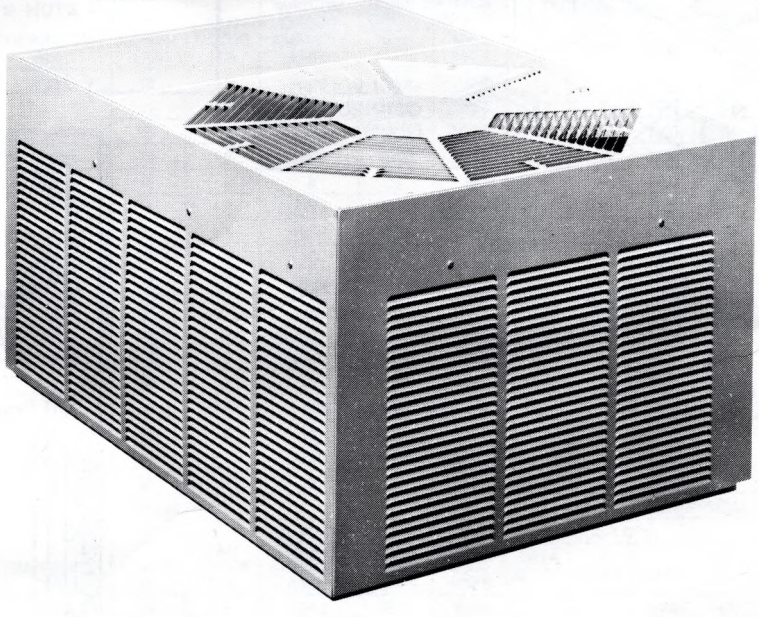
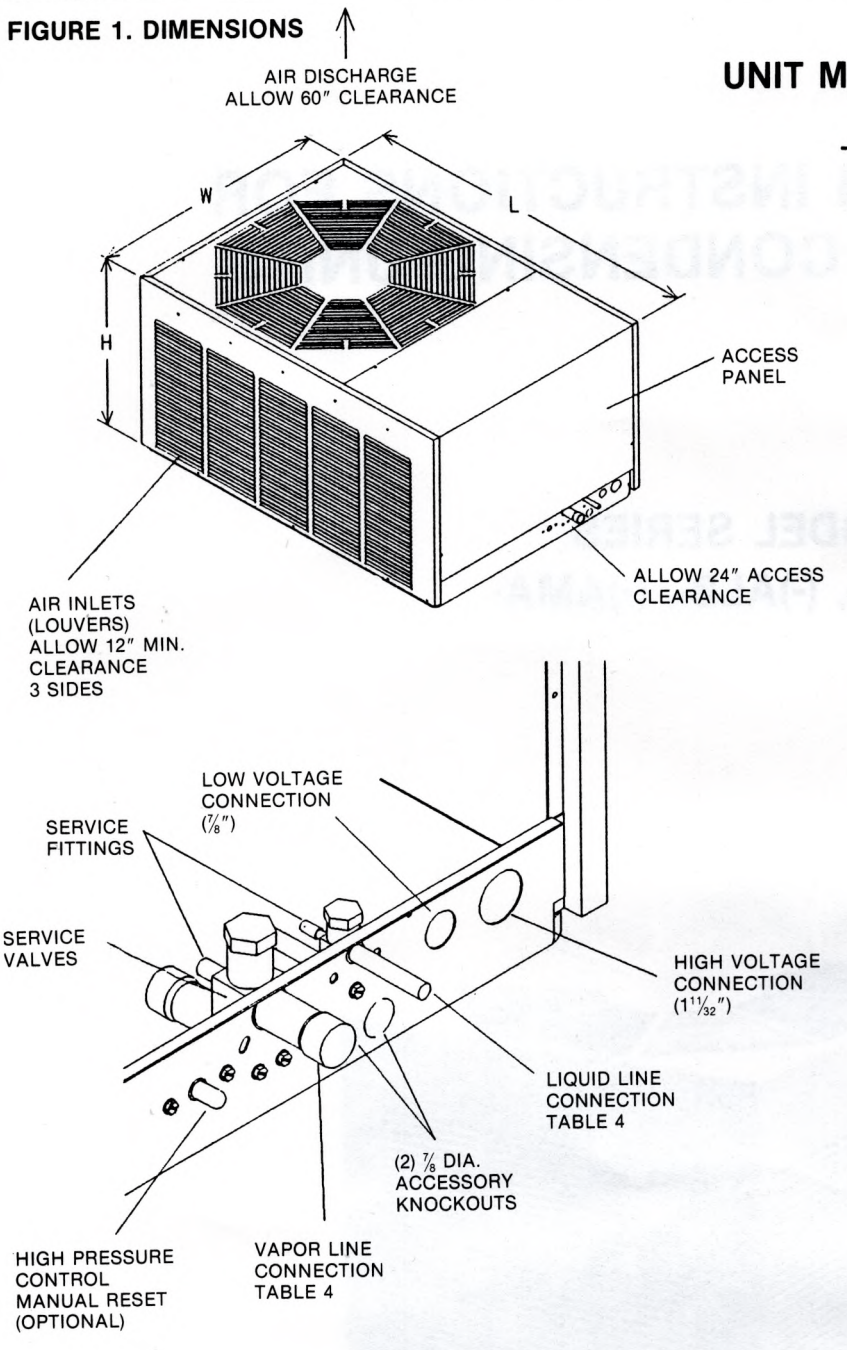
INSTALLATION INSTRUCTIONS FOR AIR COOLED CONDENSING UNITS

MODEL SERIES
(-)AKA-, (-)ALB-, (-)AMA-

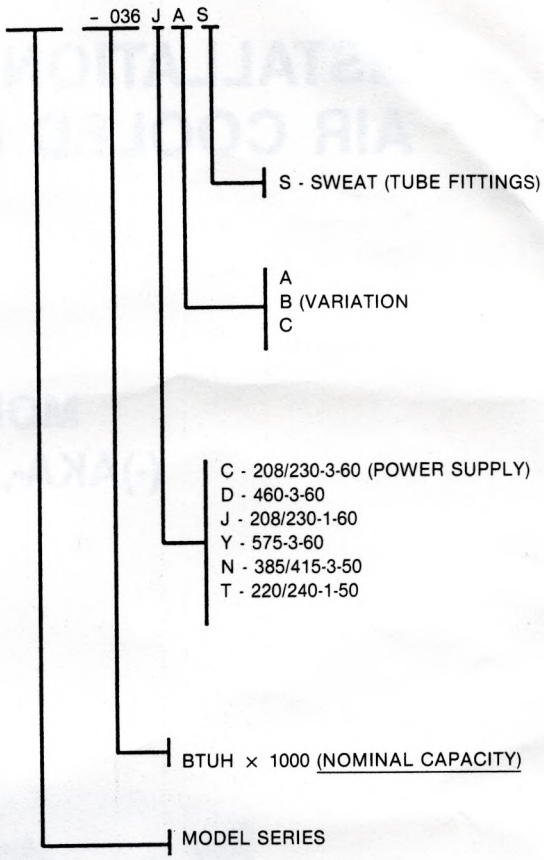


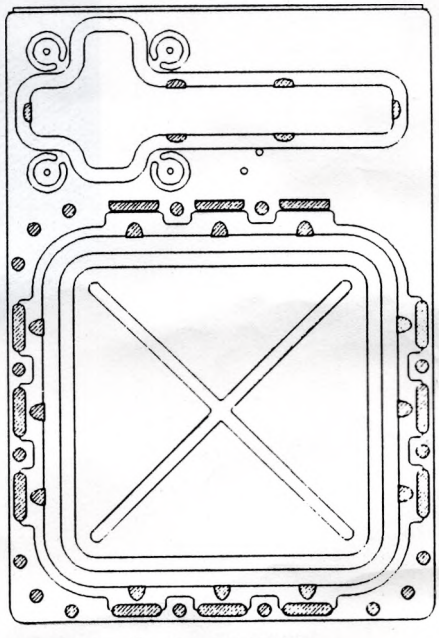
92-21354-13-02
SUPERSEDES 92-21354-13-01

FIGURE 1. DIMENSIONS



UNIT MODEL NUMBER EXPLANATION





BOTTOM VIEW SHOWING DRAIN OPENINGS (SHADED AREAS).

FIGURE 2 - BASE PAN

TABLE 1 — DIMENSIONAL DATA

CONDENSING UNIT MODEL	(-)AKA-	018, 024	030	036, 042	048, 060	
	(-)ALB-		018, 024	030, 036	042, 048, 060	
	(-)AMA-				018, 024, 030 036, 042, 048	060
LENGTH "H"		16 3/4	20 3/4	20 3/4	26 3/4	34 3/4
LENGTH "L"		33 11/16	33 11/16	38 11/16	42 9/16	43
WIDTH "W"		23 1/4	23 1/4	27 1/8	31	31

WARNING: THE MANUFACTURER'S WARRANTY DOES NOT COVER ANY DAMAGE OR DEFECT TO THE AIR CONDITIONER CAUSED BY THE ATTACHMENT OR USE OF ANY COMPONENTS, ACCESSORIES OR DEVICES (OTHER THAN THOSE AUTHORIZED BY THE MANUFACTURER) INTO, ONTO OR IN CONJUNCTION WITH THE AIR CONDITIONER. YOU SHOULD BE AWARE THAT THE USE OF UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES MAY ADVERSELY AFFECT THE OPERATION OF THE AIR CONDITIONER AND MAY ALSO ENDANGER LIFE AND PROPERTY. THE MANUFACTURER DISCLAIMS ANY RESPONSIBILITY FOR SUCH LOSS OR INJURY RESULTING FROM THE USE OF SUCH UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES.

GENERAL

The information contained in this manual has been prepared to assist in the proper installation, operation and maintenance of the air conditioning system. Improper installation, or installation not made in accordance with these instructions, can result in unsatisfactory operation and/or dangerous conditions, and can cause the related warranty not to apply.

Read this manual and any instructions packaged with separate equipment required to make up the system prior to installation. Retain this manual for future reference.

To achieve unit design operating efficiency and capacity, the indoor cooling coils listed in the condensing unit specification sheet should be used.

CHECKING PRODUCT RECEIVED

Upon receiving unit, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company. Check condensing unit model number, electrical characteristics and accessories to determine if they are correct. Check system components (evaporator coil, condensing unit, evaporator blower, etc.) to make sure they are properly matched.

Remove shipping bracket under compressor if supplied.

TABLE 2 — COPPER WIRE SIZE - AWG.
(1% Voltage Drop)

SUPPLY WIRE LENGTH FEET	SUPPLY CIRCUIT AMPACITY							
	15	20	25	30	35	40	45	50
50	14	12	10	10	8	8	6	6
100	10	8	8	6	6	6	4	4
150	8	6	6	4	4	4	3	3
200	6	4	4	4	3	3	2	2

TABLE 3 — ELECTRICAL AND PHYSICAL DATA

UNIT MODEL (-)AKA-	ELECTRICAL							PHYSICAL					
						FUSE OR HACR CIRCUIT BREAKER		OUTDOOR COIL				WEIGHT	
	PHASE HERTZ VOLTS	COMPRESSOR RLA	COMPR LRA	FAN MOTOR FLA	MINIMUM CIRCUIT AMPACITY AMPS	MIN. AMPS	MAX. AMPS	AREA SQ. FT.	NO. ROWS	CFM	R22 OZ.	NET LBS.	SHIPPING LBS.
018JA	1-60-208/230	9.0/9.0	49	.9	13/13	15/15	20/20	5.0	1	1850	46	135	145
024JA	1-60-208/230	11.5/11.5	61	.9	16/16	20/20	25/25	6.1	1	1950	51	140	150
030JA	1-60-208/230	14.7/14.7	75	.9	20/20	25/25	30/30	9.1	1	1960	68	155	165
036CA	3-60-208/230	11.5/11.5	78	1.3	16/16	20/20	25/25	11.0	1	2700	75	180	190
036DA	3-60-460	5.8	40	.6	.8	15	15	11.0	1	2700	75	180	190
036JA	1-60-208/230	17.3/17.3	96	1.3	23/23	30/30	40/40	11.0	1	2700	75	180	190
042CA	3-60-208/230	14.1/14.1	130	1.3	19/19	25/25	30/30	11.0	1	2700	79	190	200
042DA	3-60-460	7.1	64	.6	10	15	15	11.0	1	2700	79	190	200
042JA	1-60-208/230	21.8/21.8	107.4	1.3	29/29	35/35	50/50	11.0	1	2700	79	190	200
048CA	3-60-208/230	13.7/13.7	82	2.0	20/20	25/25	30/30	15.8	1	4100	113	220	230
048DA	3-60-460	6.9	41	1.0	10	15	15	15.8	1	4100	113	220	230
048JA	1-60-208/230	21.5/21.5	110	2.0	29/29	35/35	50/50	15.8	1	4100	113	220	230
048YA	3-60-575	5.2	36	.7	.8	15	15	15.8	1	4100	113	220	230
060CA	3-60-208/230	17.0/17.0	150	2.0	24/24	30/30	40/40	15.8	1	4150	112	250	260
060DA	3-60-460	9.6	73	1.0	13	20	20	15.8	1	4150	112	250	260
060JA	1-60-208/230	28.9/28.9	169	2.0	39/39	50/50	60/60	15.8	1	4150	112	250	260
060YA	3-60-575	8.3	59	.7	12	15	15	15.8	1	4150	112	250	260

UNIT MODEL (-)ALB-	ELECTRICAL							PHYSICAL					
						FUSE OR HACR CIRCUIT BREAKER		OUTDOOR COIL				WEIGHT	
	PHASE HERTZ VOLTS	COMPRESSOR RLA	COMPR LRA	FAN MOTOR FLA	MINIMUM CIRCUIT AMPACITY AMPS	MIN. AMPS	MAX. AMPS	AREA SQ. FT.	NO. ROWS	CFM	R22 OZ.	NET LBS.	SHIPPING LBS.
018JA	1-60-208/230	9.0/9.0	49	.9	13/13	15/15	20/20	9.1	1	1960	61	150	163
024JA	1-60-208/230	11.5/11.5	61	.9	16/16	20/20	25/25	9.1	1	1950	63	155	165
030JA	1-60-208/230	13.7/13.7	75	1.3	18/18	25/25	30/30	11.0	1	2700	74	169	179
036JA	1-60-208/230	18.0/18.0	87	1.3	24/24	30/30	40/40	11.0	1	2700	78	185	195
042JA	1-60-208/230	19.0/19.0	105	2.0	26/26	30/30	45/45	15.8	1	4150	100	227	237
048JA	1-60-208/230	21.8/21.8	120	2.0	29/29	35/35	50/50	15.8	2	3800	192	255	265
060JA	1-60-208/230	28.9/28.9	169	2.0	39/39	50/50	60/60	15.8	2	3800	173	275	285

UNIT MODEL (-)AMA-	ELECTRICAL							PHYSICAL					
						FUSE OR HACR CIRCUIT BREAKER		OUTDOOR COIL				WEIGHT	
	PHASE HERTZ VOLTS	COMPRESSOR RLA	COMPR LRA	FAN MOTOR FLA	MINIMUM CIRCUIT AMPACITY AMPS	MIN. AMPS	MAX. AMPS	AREA SQ. FT.	NO. ROWS	CFM	R22 OZ.	NET LBS.	SHIPPING LBS.
018JA	1-60-208/230	9.0/9.0	49	.8	13/13	15/15	20/20	15.8	1	2947	88	200	217
024JA	1-60-208/230	12.9/12.9	62.5	.8	16/16	20/20	25/25	15.8	1	2029	85	184	201
030JA	1-60-208/230	13.5/13.5	76	1.2	18/18	25/25	30/30	15.8	1	2947	96	189	206
036JA	1-60-208/230	18.0/18.0	90.5	1.2	24/24	30/30	40/40	15.8	1	2947	96	196	213
042JA	1-60-208/230	19.9/19.9	107	2.0	26/26	35/35	45/45	15.8	1	3995	100	201	218
048JA	1-60-208/230	23.7/23.7	129	2.0	32/32	45/40	50/50	17.3	2	3944	172	270	287
060JA	1-60-208/230	28.9/28.9	169	2.0	39/39	50/50	60/60	20.8	2	3995	192	309	332

CORROSIVE ENVIRONMENT

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment. This oxidation could shorten the equipment's useful life. Corrosive elements include salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries.

If the unit is to be installed in an area where contaminants are likely to be a problem, special attention should be given to the equipment location and exposure.

- Avoid having lawn sprinkler heads spray directly on the unit cabinet.
- In coastal areas, locate the unit on the side of the building away from the waterfront.
- Shielding provided by a fence or shrubs may give some protection.
- Elevating the unit off its slab or base enough to allow air circulation will help avoid holding water against the basepan.

Regular maintenance will reduce the build-up of contaminants and help to protect the unit's finish.

WARNING: DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE.

- Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
- Regular cleaning and waxing of the cabinet with a good automobile polish will provide some protection.
- A good liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protectivc coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer.

LOCATING UNIT

Consult local building codes or ordinances for special installation requirements. When selecting a site to locate the outdoor unit, consider the following:

- A minimum clearance of 24″ on one side for service access, 12″ for air inlets on all sides and 60″ for air discharge (unit top) is required.
- The unit must be located outdoors and cannot be connected to ductwork.
- Locate unit where operating sound will not disturb owner or neighbors.
- Locate unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level.
- If a concrete pad is used, do not connect slab to building foundation or structure to prevent noise transmission.
- Do not obstruct openings in bottom of the unit.
- The length of refrigerant piping and wiring should be as short as possible to avoid capacity losses and increased operating costs.
- Locate the pad at a level sufficient above grade to prevent ground water from entering the unit.

UNIT MOUNTING

If elevating the condensing unit, either on a flat roof or on a slab, observe the following guidelines:

- The base pan provided elevates the condenser coil 3/4″ above the base pad.
- If elevating a unit on a flat roof, use 4″ × 4″ stringers positioned to distribute unit weight evenly and prevent noise and vibration.

REFRIGERANT CONNECTIONS

All units are factory charged with Refrigerant 22. All models are supplied with service valves. Keep tube ends sealed until connection is to be made to prevent system contamination.

REPLACEMENT UNITS

To prevent failure of a new condensing unit, the existing evaporator tubing system must be cleaned or replaced. Care must be exercised that the expansions device is not plugged. Liquid line filter driers are recommended on all units if compressor motor has failed. Test the oil for acid. If positive, a suction line filter drier is mandatory.

NOTE: For detailed suggested procedures, refer to separate form 92-20551-19 entitled "Replacement Condensing Unit Instructions" which accompanies this booklet.

EVAPORATOR COIL

THE APPLICATION EVAPORATOR TEMPERATURE RANGE IS +32°F TO +53.5°F FOR UL LISTED CONDENSING COMPRESSOR UNITS

Tubing Connections

Coils have only a holding charge of dry nitrogen. Keep all tube ends sealed until connections are to be made.

Location

Never locate the coil in return duct of a gas or oil furnace. Provide a service inlet to the coil for inspection and cleaning. Keep the coil pitched toward the drain connection.

CAUTION: *When coil is installed over a finished ceiling and/or living area, it is recommended that a secondary sheet metal condensate pan be constructed and installed under entire unit.*

Drain Lines

Never connect a drain line that is smaller than the fitting provided on the coil. Pitch the line at least a quarter of an inch per foot away from the coil. Run the line to an open drain or outdoors.

Air Flow

Insure that the proper air flow is available as recommended for matched systems. See specifications.

Duct System

In an uninsulated attic or crawl space, 1″ fiberglass insulation with a vapor barrier skin is required. Make sure the ducts are tight and leak-free. Duct must be of adequate size for required air flow with furnace and coil.

INTERCONNECTING TUBING

Suction and Liquid Lines

Keep all lines sealed until connection is made. Connect the tubes to the evaporator coil first. Refer to the refrigerant line size charts, Tables 2 and 3, for correct piping sizes.

Always use the shortest length possible with a minimum number of bends. Use a tube bender for short bends to insure that there are no kinks in the line. To prevent noise transmission, never position the suction or liquid lines in direct contact with the building structure. Also use an isolated or suspension type hanger when possible.

Maximum Length of Interconnecting Tubing

There is no fixed maximum length for interconnecting tubing, but if over 200 feet add 3 ounces of dry refrigerant oil for each 10 feet of line over 200 feet. Oil may be added not to exceed 3 fluid ounces for each ten feet over 60 feet. Connecting lines should be kept as short as possible as there is capacity loss for each foot of vapor line tubing used. Table 4 shows multipliers to be used to determine capacity for various vapor line lengths and diameters. The losses that occur due to lines being exposed to outdoor conditions are not included. **Systems equipped with over 60′ of lines must be equipped with crankcase heaters and the applications of a pump down cycle or a suction accumulator.**

Refrigerant charging for units using capillary or fixed orifice tubes must be by the suction line superheat method. Units using thermostatic expansion valves must be charged by the liquid pressure method. See Charging Data attached inside the service panel of the unit.

Condensing Unit Installed Below Evaporator

Maximum height of evaporator above the condensing unit is 40 feet. If over 20 feet, the liquid lines should be increased to the next size larger than shown in Table 4 to prevent flashing in the liquid line. Liquid refrigerant in a vertical column will exert a downward pressure of .5 PSI per foot of elevation, in effect adding to pressure drop when flow is up.

Condensing Unit Installed Above Evaporator

There is no absolute fixed limit as to how high the condensing unit may be above the evaporator, but if **over 10 feet,** close attention must be given to line sizing, addition of oil and refrigerant charging. Oil traps are not required. The vertical portion of the liquid line **must be sized** as shown in Table 5 for use with flow checks and expansion valve coils. Erratic operating pressure can result if piping is not properly sized.

TUBING INSTALLATION

Observe the following when installing refrigerant tubing between the condensing unit and evaporator coil:

- Use clean, dehydrated, sealed refrigeration grade tubing.
- Always keep tubing sealed until tubing is in place and connections are to be made.
- If there is any question as to how clean the liquid and vapor lines are, blow out with dry nitrogen before connecting to the outdoor unit and indoor coil. Any debris in the line set will end up plugging the expansion device.
- As an added precaution, you may install a good filter drier in the liquid line.
- Vapor line and liquid line must not be in contact with each other. The vapor line must be insulated.
- If tubing has been cut, make sure ends are deburred while holding in a position to prevent chips from falling into tubing. Burrs such as those caused by tubing cutters can affect performance dramatically, particularly on small liquid line sizes.
- For best operation, keep tubing run as short as possible with a minimum number of elbows or bends.
- Locations where the tubing will be exposed to mechanical damage should be avoided. If it is necessary to use such locations, copper tubing should be housed to prevent damage.
- If tubing is to be run underground, it must be run in a sealed watertight chase.
- Use care in routing tubing and do not kink or twist. Use a good tubing bender on the vapor line to prevent kinking.
- Route the tubing using temporary hangers, then straighten the tubing and install permanent hangers. Line must be adequately supported.
- The vapor line must be insulated to prevent dripping (sweating) and prevent performance losses. Armaflex and Rubatex are satisfactory insulations for this purpose. Use 1/2″ minimum insulation thickness, additional insulation may be required for long runs.
- Check Table 4 for correct liquid and vapor line sizing for condensing unit size and length of run.

TUBING CONNECTIONS

- Be certain both refrigerant service valves at the condensing unit are closed (turn fully clockwise).
- All lines should be assembled with type "L" refrigerant tubing and not with copper water pipe. They should be brazed with the following alloys:

  Copper to Copper - 5% Silver Alloy (no flux)
  Copper to Steel or Brass - 35% Silver Alloy (no flux)
- Clean the inside of fittings and the outside of the tubing with steel wool or sand cloth before soldering. Always keep chips, steel wool, dirt, etc., out of the inside when cleaning. Assemble tubing part way into fitting. Apply flux all around the outside of the tubing and push tubing into stop. This procedure will keep the flux from getting inside the system.
- Remove cap and schrader core from service port to protect seals from heat damage.
- Wrap service valves with a wet rag before applying heat, braze the tubing between outdoor unit and indoor coil. Flow dry nitrogen into a service port and through the tubing while brazing.

LEAK TESTING

- Pressurize line set and coil through service fittings with dry nitrogen to 150 psig maximum. Leak test all joints using liquid detergent. If a leak is found, recover pressure and repair.

WARNING: DO NOT USE OXYGEN TO PURGE LINES OR PRESSURE SYSTEM FOR LEAK TEST. OXYGEN REACTS VIOLENTLY WITH OIL, WHICH CAN CAUSE AN EXPLOSION RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

- The indoor coil and tubing of sweat type units must be evacuated before operating unit. See evacuation procedure.
- The brass valve is not a backseating valve. Opening or closing valve does not close service port.

NOTE: 3/16″ and 5/16″ Allen wrenches are required for brass service valves.

Extreme caution must be exercised not to force valve stem against the retaining ring when opening the valves. System pressure could force the valve stem out of the valve body and possibly cause personal injury. In the event that the retaining ring is missing, do not attempt to open the valve.

TABLE 4 — REFRIGERANT LINE SIZE INFORMATION

CONDENSING UNIT REFRIGERANT TUBING DATA																										
MODEL	(-)AKA-	018		024		030		036				042								048			060			
	[-]ALB-		018		024		030						036		042				048					060		
	(-)AMA-								018	024	030						036				042	048			060	
FACTORY CHARGE, OZ ①		46	61	51	63	68	74	75	88	85	96	79	78		100		96		192	113	100	172	112	173	192	
REFRIGERANT VAPOR CONNECTION SIZE ON UNIT		5/8" I.D. SWEAT	3/4" I.D. SWEAT										7/8" I.D. SWEAT							1-1/8" I.D. SWEAT④						
REFRIGERANT LIQUID CONNECTION SIZE ON UNIT		5/16" I.D. SWEAT③																3/8" I.D. SWEAT								

RECOMMENDED VAPOR AND LIQUID LINE SIZES (O.D.) FOR VARIOUS LENGTH RUNS					
LENGTHS UP TO 30 FEET	SUCT.	5/8" O.D.	3/4" O.D.	7/8" O.D.	1-1/8" O.D.
	LIQ.	1/4" O.D.		5/16" O.D.	3/8" O.D.
LENGTHS 31 TO 45 FEET	SUCT.	5/8" O.D.	3/4" O.D.	7/8" O.D.	1-1/8" O.D.
	LIQ.	20'-1/4" O.D. BALANCE 5/16" O.D.		25'-5/16" O.D. BALANCE 3/8" O.D.	25'-3/8" O.D. BALANCE 1/2" O.D.
LENGTHS 46 TO 60 FEET	SUCT.	3/4" O.D.	3/4" or 7/8" O.D. SEE CAPACITY MULTIPLIER ②	7/8" or 1-1/8" O.D. SEE CAPACITY MULTIPLIER②	1-1/8" O.D.
	LIQ.	15'-1/4" O.D. BALANCE 5/16" O.D.		20'-5/16" O.D. BALANCE 3/8" O.D.	20'-3/8" O.D. BALANCE 1/2" O.D.
LENGTHS 61 TO 90 FEET	SUCT.	3/4" O.D.	3/4" or 7/8" O.D. SEE CAPACITY MULTIPLIER②	7/8" or 1-1/8" O.D. SEE CAPACITY MULTIPLIER②	1-1/8" O.D.
	LIQ.	5/16" O.D.		10'-5/16" O.D. BALANCE 3/8" O.D.	10'-3/8" O.D. BALANCE 1/2" O.D.
LENGTHS 91 TO 120 FEET	SUCT.	3/4" O.D.	3/4" or 7/8" O.D. SEE CAPACITY MULTIPLIER②	7/8" or 1-1/8" O.D. SEE CAPACITY MULTIPLIER②	1-1/8" O.D.
	LIQ.	80'-5/16" O.D. BALANCE 3/8" O.D.		3/8" O.D.	1/2" O.D.
LENGTHS 121 TO 150 FEET	SUCT.	3/4" O.D.	3/4" or 7/8" O.D. SEE CAPACITY MULTIPLIER②	7/8" or 1-1/8" O.D. SEE CAPACITY MULTIPLIER②	1-1/8" O.D.
	LIQ.	60'-5/16" O.D. BALANCE 3/8" O.D.		100'-3/8" O.D. BALANCE 1/2" O.D.	1/2" O.D.

CAPACITY MULTIPLIER FOR VARYING VAPOR LINE SIZES AND LENGTH RUNS②										
VAPOR TUBING SIZE O.D.	5/8 3/4	5/8 3/4 7/8	3/4 7/8	3/4 7/8	3/4 7/8 1-1/8	3/4 7/8 1-1/8	7/8 1-1/8	7/8 1-1/8 1-3/8	7/8 1-1/8 1-3/8
30 FT. LENGTH	1.00 1.01	.98 1.00 1.01	1.00 1.01	1.00 1.01	.99 1.00 1.01	.99 1.00 1.01	1.00 1.01	.99 1.00 1.01	.99 1.00 1.01
60 FT. LENGTH	.98 1.00	.96 .98 1.00	.98 1.00	.98 1.00	.97 .99 1.01	.97 .99 1.01	.98 1.00	.97 1.00 1.01	.97 1.00 1.01
90 FT. LENGTH	.97 .99	.94 .97 .99	.97 .99	.96 .99	.96 .98 1.00	.94 .98 1.00	.96 1.00	.96 .99 1.00	.95 .99 1.00
120 FT. LENGTH	.95 .99	.91 .95 .99	.95 .99	.94 .98	.94 .98 1.00	.92 .97 1.00	.94 .99	.94 .99 1.00	.93 .99 1.00
150 FT. LENGTH	.94 .98	.88 .94 .98	.94 .98	.93 .97	.92 .97 1.00	.89 .96 1.00	.92 .98	.93 .99 1.00	.91 .98 1.00

①Factory charge is sufficient for 25 Ft. of recommended liquid line and matching evaporator. For different lengths, adjust charge accordingly:

1/4" Liquid Line ± .3 oz per foot
5/16" Liquid Line ± .4 oz per foot
3/8" Liquid Line ± .6 oz per foot
1/2" Liquid Line ± 1.2 oz per foot

②Capacity multiplier x rated capacity = actual capacity
Example -024 with 60' of 3/4" O.D. Vapor Line
24.000 x 98 = 23.520 BTUH.

③Approx. 5/16" I.D. will accept 1/4" O.D. field liquid line.
④Requires adapter supplied with unit (packed inside).

TABLE 5—LINE SIZING WITH CONDENSING UNIT OVER 10 FEET ABOVE EVAPORATOR

NOMINAL TONS	Liquid Line Sizing (O.D.)	
	Horizontal Run①	Vertical Run②
1-1/2	1/4"	100% - 3/16"
2	1/4"	80% - 1/4" & 20% - 5/16"
2-1/2	1/4"	40% - 1/4" & 60% - 5/16"
3	5/16"	20% - 1/4" & 80% - 5/16"
3-1/2	5/16"	100% - 5/16"
4	3/8"	80% - 5/16" & 20% - 3/8"
5	3/8"	40% - 5/16" & 60% - 3/8"

① See Table 4 if horizontal run exceeds 30 feet.
② The smaller size tubing must be at the bottom of the run. The combination shown will result in approximately zero net pressure drop for vertical run.

TABLE 6

CONDENSING UNIT APPROVED APPLICATION MATCHES WITH FLOWCHECK PISTON SIZES REQUIRED					
CONDENSING UNIT MODEL & SIZE	EVAPORATOR MODEL NUMBER & SIZE	PISTON SIZE REQUIRED	① COIL CODE		SYSTEM CHG. OZ.
			ELEC. FURN.	HP AH	
(-)AKA-018	RCBA-2453	53	B	B	46
(-)AKA-024	RCBA-2457	57	C	D	51
(-)AKA-030	RCBA-3665	65	B	D	68
(-)AKA-036	RCBA-3673	73	C	C	75
(-)AKA-042	RCBA-4878	78	B	B	79
(-)AKA-048	RCBA-4876	76	C	D	113
(-)AKA-060	RCBA-6089	89	B	B	112

① Coil Code In Electric Furnace Or Air Handler Model Number.

TABLE 7

CONDENSING UNIT APPROVED APPLICATION MATCHES WITH TXV AND PISTON SIZES REQUIRED				
CONDENSING UNIT MODEL & SIZE	EVAPORATOR MODEL NUMBER & SIZE	TXV SIZE (TON)	PISTON SIZE	COIL SLABS
(-)ALB-018 (-)AMA-018	RCGA-24A1	1.5	120	4
(-)ALB-024 (-)AMA-024	RCGA-24A2	2.0	172	4
(-)ALB-030 (-)AMA-030	RCGA-36A1	2.5	157	6
(-)ALB-036 (-)AMA-036	RCGA-36A2	3.0	157	6
(-)ALB-042 (-)AMA-042	RCGA-48A1	4.0	172	8
(-)ALB-048 (-)AMA-048	RCGA-48A1	4.0	172	8
(-)ALB-060 (-)AMA-060	RCGA-60A1	5.0	172	10

FLOW CHECK PISTON

The flow check piston is a multi-purpose device. With flow into the compression nut end from the liquid line, the piston acts as the expansion device with flow through the metering orifice in the center of the piston. The "O" ring on the end of the piston prevents refrigerant from bypassing the metering orifice. Flow from the metering orifice is centered into a distributor which serves to evenly distribute refrigerant to the evaporator circuits.

It is essential that the evaporator and condensing unit be properly matched. Use only matched components as shown in sales specification sheets. See Table 6 for the appropriate piston size for the evaporator and condensing unit combination.

A piston size that is too small will cause starving and one that is too large will cause flooding. In any case, system performance and reliability will be unacceptable.

If a combination is used that requires a piston size change (see Table 6), the combination **cannot** be used without changing to the correct size piston.

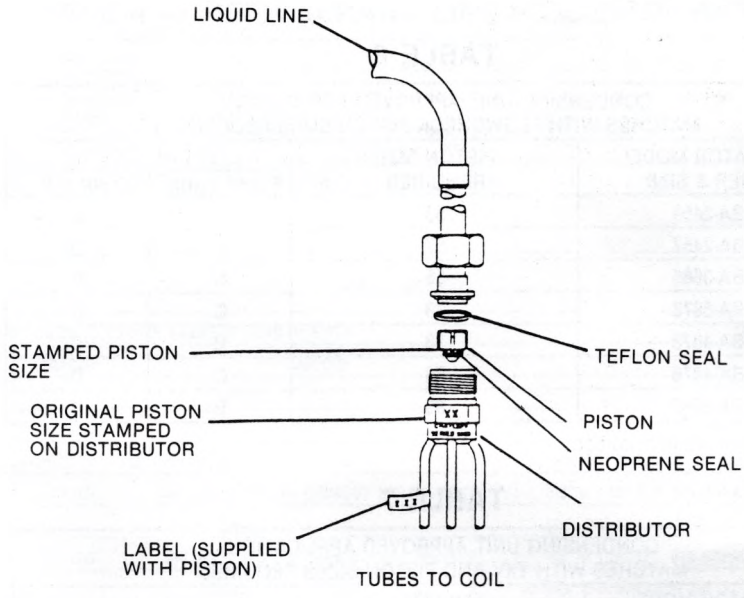
Change the piston in the distributor on the evaporator before installing the coil and charging the system following the procedure shown below:

- Using a back-up wrench on the distributor body, loosen the compression nut to gain access to the piston.
- Using the wire provided with replacement pistons, run (hooked end) through hole in piston.
- Hook nose end of piston and lift gently from distributor body.
- Replace piston with one of proper size (see Table 6). Install piston with gasket end of piston in distributor. Do not force piston into distributor.
- NOTE: With piston in distributor, seal end should be down and should not be seen looking in end of distributor. Pistons must be free to rotate and move up and down. Make sure piston is free to move in distributor body.
- Insure distributor gasket is located properly in the distributor body.
- Replace compression nut using back-up wrench on distributor body. Torque compression nut with 8 to 10 ft./lbs.
- Original piston size is stamped on outside of distributor body. Remove new piston size label from poly bag new piston came in and install new size label on outside of distributor tube.
- Check fittings for leaks after installation, evacuation and charging is complete.

CAUTION: *Do not attempt to drill pistons to size in the field. Metering holes have a special champhered inlet and cannot be modified.*

WARNING: DO NOT REPLACE THE NEOPRENE "O" RING ON THE PISTON WITH ANY TYPE OF SEAL. CONTACT THE PARTS DEPARTMENT FOR THE EXACT REPLACEMENT "O" RING.

PISTON AND DISTRIBUTOR ASSEMBLY



NOTE: PISTON, PISTON SEAL AND INSIDE OF DISTRIBUTOR MUST BE CLEAN AND FREE OF NICKS, BURRS OR OTHER DAMAGE.

NOTE: **DO NOT** REPLACE NEOPRENE SEAL WITH ANY "O" RING. CONTACT PARTS DEPT. FOR EXACT REPLACEMENT.

EVACUATION PROCEDURE

Evacuation is the most important part of the entire service procedure. The life and efficiency of the equipment is dependent upon the thoroughness exercised by the serviceman when evacuating air and moisture from the system.

Air in a system causes high condensing temperatures and pressure, resulting in increased power input and reduced performance.

Moisture chemically reacts with the refrigerant and oil to form corrosive hydrofluoric and hydrochloric acids. These attack motor windings and parts, causing breakdown.

After the system has been leak checked and proven sealed, connect the vacuum pump and evacuate system to 29.5". The vacuum pump must be connected to both the high and low sides of the system through adequate connections. Use the largest size connections available since restrictive service connections may make the process so slow as to be unacceptable. This may lead to false readings because of pressure drop through the fittings.

CAUTION: *Compressors (especially scroll type) should never be used to evacuate the air conditioning system. Vacuums this low can cause internal electrical arcing, resulting in a damaged or failed compressor.*

With thermostat in the "Off" position, turn the power on to the furnace and the condensing unit. Before starting condensing unit allow 12 hours time to elapse, giving crankcase heater (if provided) time to drive refrigerant from the compressor, thus preventing damage during start-up. Start the condensing unit and the furnace with the thermostat. Make sure the blower is operating.

CHECKING REFRIGERANT CHARGE

Charge for all systems should be checked against the Charging Chart inside the access panel cover. Before using the chart, the indoor conditions must be within 2°F (2° wet bulb) of desired comfort conditions and system must be run until operating conditions stabilize (15 min. to 30 min.).

CAUTION: *Do not operate the compressor without charge in system.*

Addition of R-22 will raise pressures (vapor, liquid and discharge) and lower vapor temperature.

CAUTION: *If addition of R-22 raises both vapor pressure and temperature, unit is overcharged.*

CHARGING BY SUPERHEAT

Superheat charging method is used for charging systems when a flow check piston or capillary tubes are used on the evaporator as a metering device.

Pressure reading and charging is accomplished using the service port located on the vapor service valve (large valve) located on the base pan. (See Figure 1.)

Vapor temperature readings must be taken on the vapor line going from the vapor service valve (large valve) and the compressor. A remote temperature indicator is most convenient. If this is not available, a thermometer properly located and insulated can be used.

Measure and record the three values required. Find the intersection of vapor line pressure and outdoor ambient on the charging chart. The vapor line temperature should approximate the intersect value on the chart.

The most likely causes for the intersection of vapor pressure and ambient temperature in the open area to (left) or (right) of table values are: (Left): Low charge, low airflow; (Right): Overcharge, high airflow.

CHARGING BY LIQUID PRESSURE

Liquid pressure method is used for charging systems in the cooling mode when an expansion valve is used on the evaporator. The service port on the liquid service valve (small valve) is used for this purpose.

Measure and record the three values required. Find the intersection of outdoor ambient and indoor ambient (°F W.B.) on the Charging Chart. The liquid line pressure should approximate the intersect value on the chart.

CHARGING BY WEIGHT

For a new installation, evacuation of interconnecting tubing and evaporator coil is adequate; otherwise, evacuate the entire system. Use the factory charge shown in Table 4 of these instructions or unit data plate. Note that charge value includes charge required for 25 ft. of standard size interconnecting liquid line. Calculate actual charge required with installed liquid line size and length using: (1/4" O.D. = .6 oz./ft.), (5/16" O.D. = .4 oz./ft.), (3/8" O.D. = .6 oz./ft.), 1/2" O.D. = 1.2 oz./ft.). With an accurate scale (+/– 1 oz.) or volumetric charging device, adjust charge difference between that shown on the unit data plate and that calculated for the new system installation. If the entire system has been evacuated, add the total calculated charge.

FINAL LEAK TESTING

After the unit has been properly evacuated and charged, a halogen leak detector should be used to detect leaks in the system. All piping within the condensing unit, evaporator, and interconnecting tubing should be checked for leaks. If a leak is detected, the refrigerant should be recovered before repairing the leak. The Clean Air Act prohibits releasing refrigerant into the atmosphere.

SERVICE

Operation

Most single phase units are operated PSC (no starting components). It is important that such systems be off for a minimum of 5 minutes before restarting to allow equalization of pressure. The thermostat should not be moved to cycle unit without waiting 5 minutes. To do so may cause the compressor to go off on an automatic overload device or blow a fuse. Poor electrical service can also cause nuisance tripping on overloads or blow fuses. This generally can be corrected by adding start components. Check with factory for recommended start components, if required. **For PSC type operation, refrigerant metering must be done with fixed orifice, cap tubes or bleed type expansion valves because of low starting torque. If non-bleed expansion valve coils (supplied by factory) are used, start components are required.**

Single-Pole Compressor Contactor (CC)

Single-pole contactors are used on all standard single phase units up through 5 tons. Caution must be exercised when servicing as only one leg of the power supply is broken with the contactor. Two pole contactors are used on some three phase units.

OPTIONAL FIELD INSTALLED ACCESSORIES

(Available through the Sales Order Center)

Compressor Crankcase Heat (CCH)

All heaters are located on the lower half of the compressor shell. Its purpose is to drive refrigerant from the compressor shell during long off cycles, thus preventing damage to the compressor during starting.

At initial start-up or after extended shutdown periods, make sure the heater is energized for at least 12 hours before the compressor is started. (Disconnect switch on and wall thermostat off.)

NOTE: Crankcase heaters are not required for scroll compressors.

Hard Start Components (SC and SR)
(Available thru Parts Department Only)

The start component kit includes start capacitor (SC) and start relay (SR). **Start components are required with all non-bleed expansion valve coils.**

NOTE: Start components are not required for scroll compressors.

Time Delay Control (TDC)

The time delay (TDC) is in the low voltage control circuit. When the compressor shuts off due to a power failure or thermostat operation, this control keeps it off at least 5 minutes which allows the system pressure to equalize, thus not damaging the compressor or blowing fuses on start-up.

Low Ambient Control (LAC)

This component senses compressor head pressure and shuts the condenser fan off when the head pressure drops to approximately 175 PSIG. This allows the unit to build a sufficient head pressure at lower ambient in order to maintain system balance and obtain improved capacity. Low ambient control should be used on all equipment operated below 65°F ambient.

High and Low Pressure Controls (HPC or LPC)

These controls keep the compressor from operating in pressure ranges which can damage it. Both controls are in the low voltage control circuit.

High pressure control (HPC) is a manual reset which operates near 450 PSIG. Do not reset arbitrarily without first determining what caused it to function.

The low pressure control (LPC) is an automatic reset which operates near 15 PSIG and resets near 40 PSIG.

NOTE: High and low pressure controls may be standard on some models.

ELECTRICAL WIRING

Field wiring must comply with the National Electric Code (C.E.C. in Canada) and any applicable local ordinance.

POWER WIRING

It is important that proper electrical power is available at the condensing unit contactor. Voltage should not vary more than 10% of that stamped on the rating plate when the unit is trying to start. Interphase variation on the three-phase units must not be more than 3%.

Install a branch circuit disconnect within sight of the unit and of adequate size to handle the starting current. (See Table 3.)

For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from Table 2 using the circuit ampacity found on the unit rating plate. From the unit disconnect to unit, the smallest wire size allowable in Table 2 should be used.

Power wiring must be run in grounded, raintight conduit. Conduit must be run through the connector panel below the access cover and attached to the bottom of the control box. (See Figure 1.)

Connect power wiring to contactor located in outdoor heat pump electrical box. (See wiring diagram attached to unit access panel.)

Check all electrical connections, including factory wiring within the unit and make sure all connections are tight.

DO NOT connect aluminum field wire to the contactor terminals.

SPECIAL INSTRUCTION FOR POWER WIRING WITH ALUMINUM CONDUCTORS

- Select the equivalent aluminum wire size from the tabulation below:

AWG Copper Wire Size	AWG Aluminum Wire Size	Connector Type & Size (or equivalent)	
#12	#10	T & B Wire Nut	PT2
#10	#8	T & B Wire Nut	PT3
#8	#8	Sherman Split Bolt	TSP6
#6	#4	Sherman Split Bolt	TSP4
#4	#2	Sherman Split Bolt	TSP2

- Attach a length (6" or more) of recommended size copper wire to the unit contactor terminals L1 and L3 for single phase, L2 and L3 for three phase.
- Splice copper wire pigtails to aluminum wire with U.L. recognized connectors for copper-aluminum splices. Follow these instructions very carefully to make a positive and lasting connection.
- Strip insulation from aluminum conductor.

- Coat the stripped end of the aluminum wire with the recommended inhibitor, and wire brush aluminum surface through inhibitor. INHIBITORS: Brundy-Pentex "A"; Alcoa No. 2EJC; T & B-KPOR Shield.
- Clean and recoat aluminum conductor with inhibitor.
- Make the splice using the above listed wire nuts or split bolt connectors.
- Coat the entire connection with inhibitor and wrap with electrical insulating tape.

GROUNDING

WARNING: THE UNIT MUST BE PERMANENTLY GROUNDED.

A grounding lug is provided near contactor for a ground wire. Grounding may be accomplished by grounding the power wire conduit to the condensing unit. Make sure the conduit nut locking teeth have pierced the insulating paint film.

CONTROL WIRING

If the low voltage control wiring is run in conduit with the power supply, Class I insulation is required. Class II insulation is required if run separate. Low voltage wiring may be run through the insulated bushing provided in the 7/8 hole in the base panel, up to and attached to the pigtails from the bottom of the control box. Conduit can be run to the base panel if desired by removing the insulated bushing.

A thermostat and a 24 volt, 20 VA minimum transformer are required for the control circuit of the condensing unit. The furnace or the air handler transformer may be used if sufficient. See the wiring diagram for reference.

START UP AND PERFORMANCE

Even though the unit is factory charged with Refrigerant-22, the charge must be checked by the charge table attached to the service panel and adjusted, if required. Allow a minimum of 30 minutes running. See the instructions on the unit service panel for marking the total charge on the unit rating plate.

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS

Thermostat Load - Amps	SOLID COPPER WIRE - AWG.					
3.0	16	14	12	10	10	10
2.5	16	14	12	12	10	10
2.0	18	16	14	12	12	10
	50	100	150	200	250	300
	Length of Run - Feet (1)					

(1) Wire length equals twice the run distance.
NOTE: Do not use control wiring smaller than No. 18 AWG between thermostat and outdoor unit.

USE AND CARE INSTRUCTIONS FOR YOUR AIR COOLED CONDENSING UNIT

Thermostat Operation

We find most air conditioning units are installed with a single stage heating and cooling thermostat which includes a manual heat/cooling system switch and a manual/auto fan switch.

For cooling, position the system switch to "cool" and the fan switch to "auto". If constant fan operation is desired, place the fan switch in the "on" position.

When heating is desired, position the system switch to call for heating and place the fan switch in the "auto" position.

We suggest that you experiment with **constant air circulation** during the heating and cooling cycles. To achieve this style of operation, place the fan switch on the thermostat subbase to the "on" position. You may enjoy the comfort associated with the continuous air movement, constant air filtration, and the near even temperature from floor to ceiling.

Selection of Room Temperature

It is most important to select the comfort temperature you desire for either heating or cooling by use of the thermostat temperature selector.

DO NOT PLAY WITH THE THERMOSTAT. SET IT AND FORGET IT.

If the temperature selection procedure is new to you, ask your installing contractor to familiarize you with the operation of the thermostat.

System Operation Information

1. Keep the filter clean. Your system will operate more efficiently and provide better conditioned air, more economically.
2. Arrange your furniture and drapes so that the supply and return air registers and grilles are unobstructed.
3. Close doors and windows. This will reduce the cooling load on your system for a more economical operation.
4. Avoid excessive use of kitchen exhaust fans.
5. Window shades and awnings will reduce the cooling load.
6. Unless you plan to clean the coil in the outdoor unit, do not disconnect the main power to your unit. This is a safety precaution for the protection of the compressor. Otherwise, use the thermostat switches to shut the system off.
7. For extended periods of inoperation, set the thermostat system switch in the off position and the fan switch in the auto position.
8. If unit is shut off at thermostat, wait 5 minutes before restarting.
9. We suggest that you do not allow the outdoor unit to become a play stand for children. This could be dangerous to the child.
10. A regular period of waxing the finish on an outdoor unit will increase the life of the finish.
11. Remember to keep the air filters clean for efficiency and energy saving operation.

Things You May Do

1. **WARNING: Turn off main electrical power to the outdoor unit or indoor unit before attempting any maintenance operation.**
2. Keep air filters clean. There are several types of materials used in air filters and there are many possible locations for air filters. Consult with your contractor as to the location of the filters and type of material in use.
3. How To Clean:
   Glass Fiber—(Throwaway) This is a disposable type of filter. Inspect monthly and replace when necessary. A new home will normally require more frequent attention to the filters.
   Aluminum Mesh—Wash with detergent and water. Air dry thoroughly and renew the coating in compliance with the manufacturer's instructions.
   Plastic Impregnated Fiber—Wash with detergent and water or vacuum clean, then reinstall.

   CAUTION: DO NOT OPERATE YOUR SYSTEM FOR EXTENDED PERIODS WITHOUT FILTERS, AS THE DUST ENTRAINED IN THE AIR MAY PACK INTO THE FIN AREA OF THE INDOOR COIL CREATING A CONDITION WHICH COULD REQUIRE EXTENSIVE REPAIRS.
4. Oiling of Electrical Motors:
   The blower motor sleeve bearings are prelubricated by the motor manufacturer and may not require attention for an indefinite period of time. However, our recommendations are as follows:
   A. Motors without oiling ports—
      Prelubricated and sealed. No further lubrication should be required, but in case of bearing problems, the blower and the motor end bells of some motors can be disassembled and the bearings relubricated by a qualified service person.
   B. Motors with oiling ports—
      Add from 10 to 20 drops of Electric Motor Oil or an SE grade of non-detergent SAE-10 or 20 motor oil to each bearing every two years for somewhat continuous duty, or at least every five years for light duty. Take care not to over oil, because excessive lubrication can damage the motor.

92-20802-01-12
SUPERSEDES 92-20802-01-11

The compressor motor is in a sealed system so it does not require lubrication.

5. If the indoor blower assembly is belt driven, periodically check the system for belt tension and condition. Turn thermostat system for belt tension and condition. Turn thermostat system switch off and disconnect power to indoor unit. Depress the belt midway between the two pulleys. The belt should deflect approximately 3/4 of an inch at this position. Also check for cracks in the belt. The belt should be replaced if wear is indicated. If in doubt, call your servicing contractor. When the check is completed, restore main power to indoor unit and reset the thermostat system switch to the on position.
6. If your outdoor unit is equipped with an external manual high pressure switch reset button, have your servicing contractor familiarize you with its location. Many models have compressors equipped with internal pressure relief valves using an automatic reset feature eliminating the need for an external control. This high pressure switch or the relief valve will open under excessive high pressure to protect the compressor. Some models with internal relief valves will require power interruption prior to resetting itself. The high refrigerant pressure may be due to a temporary condition, so if your unit is equipped with a reset button you may reset it as required. However, if the problem persists, refer to item 8, and/or refer the problem to your servicing contractor.
7. If the condenser coil is allowed to become restricted by dirt, lint, paper, grass clippings, leaves, etc., the system efficiency will suffer and abnormally high refrigerant operating pressures will result. To correct this condition, be sure to first cut off power to the unit, and then clean such material from the condenser coil and cabinet. Using a garden hose with a nozzle can be effective in cleaning the condenser coil, but the water should be sprayed from the inside to outside of the coil in the opposite direction from the normal airflow when the condensing unit is operating.
8. If you know or suspect that the compressor in the outdoor section is not working, you should place the thermostat system switch on the thermostat subbase to the off position. This will stop the operation of the outdoor unit.
9. If you suspect that a problem has developed with your system and before you advise your servicing contractor, we suggest you check the following service hints:

Problem — Remedy

No Cooling

1. Set thermostat correctly. Return system switch to the off position, wait 5 minutes before returning system switch to cool position.
2. Reset high pressure switch on outdoor unit.
3. Check fusing or circuit breakers serving outdoor and indoor units.
4. Call servicing contractor.

Insufficient cooling — Unit operates continuously

1. Check air filters.
2. Check for blocked return air system.
3. Check to see if supply registers have been closed.
4. Check for open doors and windows.
5. Call your servicing contractor.

Please do not attempt any servicing operation with which you are not familiar or experienced unless you are advised by your servicing contractor of the proper procedures.

Thank you. Now relax and enjoy the cool air.

Protecting Equipment From The Environment

The metal parts of this unit may be subject to rust or deterioration in adverse environmental conditions. This oxidation could shorten the equipment's useful life. Salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries are especially corrosive.

WARNING: DISCONNECT ALL POWER TO UNIT BEFORE STARTING MAINTENANCE!

1. Avoid having lawn sprinkler heads spray directly on the unit cabinet.
2. Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
3. Regular cleaning and waxing of the cabinet with a good automobile polish will provide some protection.
4. A good liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protective coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer.

The best protection is frequent cleaning, maintenance and minimal exposure to contaminants.

IMPORTANT STARTUP CHARGING INSTRUCTIONS

THE LIQUID LINE PRESSURE SHOULD BE USED FOR BALANCING THE REFRIGERANT CHARGE IN AN EXPANSION VALVE SYSTEM AND FLOWCHECK SYSTEMS WHEN INDOOR TEMPERATURES ARE ABOVE COMFORT CONDITIONS. RECHECK CHARGE ON ALL FLOWCHECK SYSTEMS USING SUPER-HEAT METHOD AFTER NORMAL COMFORT CONDITIONS ARE REACHED.

LIQUID LINE PRESSURE CHARGING METHOD

1. READ AND RECORD OUTDOOR AMBIENT TEMPERATURE ENTERING CONDENSING UNIT.
2. READ AND RECORD LIQUID LINE PRESSURE AT THE SERVICE VALVE (SMALL VALVE).
3. USE PROPER TABLE SHOWN BELOW AS DETERMINED BY THE MODEL AND UNIT SIZE.
4. AT THE OUTDOOR AMBIENT TEMPERATURE, DETERMINE LIQUID LINE PRESSURE AND ADJUST THE R-22 CHARGE IF REQUIRED.

   ADDING R-22 WILL RAISE LIQUID LINE PRESSURE. REMOVING R-22 WILL LOWER LIQUID LINE PRESSURE.

LIQUID LINE PRESSURE, PSIG (SMALL VALVE)

OUTDOOR TEMPERATURE	10 SEER MODELS							11 SEER MODELS							12 SEER MODELS						
MODEL SIZE	18	24	30	36	42	48	60	18	24	30	36	42	48	60	18	24	30	36	42	48	60
115	327	338	343	330	341	324	336	304	320	322	327	313	303	315	282	295	304	318	315	295	303
110	309	321	325	311	321	306	318	288	303	305	310	297	287	297	266	279	288	301	298	279	286
105	292	304	309	295	304	290	301	272	287	288	293	280	270	280	251	263	272	284	281	262	270
100	275	287	292	280	289	273	284	256	271	271	276	264	254	263	236	246	256	267	264	246	254
95	260	270	277	260	272	254	270	240	254	254	259	247	237	245	220	230	240	250	247	229	237
90	242	253	260	248	255	240	250	223	238	237	242	231	221	228	205	214	224	233	230	212	221
85	227	236	245	232	238	223	235	207	221	220	225	214	205	210	190	198	208	216	213	196	204
80	213	219	230	216	222	207	219	191	205	203	208	198	188	193	174	182	192	199	196	179	188
75	196	202	214	199	208	191	202	175	189	186	191	181	172	176	159	166	176	181	179	163	172
70	183	185	200	185	192	174	188	159	172	169	175	165	155	158	144	150	160	164	162	146	155
65	168	168	184	171	179	157	174	143	156	152	158	148	139	141	128	134	144	147	145	129	139

SUPERHEAT CHARGING METHOD – FLOWCHECK SYSTEMS ONLY

THIS METHOD OF CHARGING IS EFFECTIVE ONLY WHEN THE INDOOR CONDITIONS ARE WITHIN 2°F OF DESIRED INDOOR COMFORT CONDITIONS AND THE VAPOR LINE PRESSURE AND TEMPERATURE ARE STABILIZED.

CAUTION: USE LIQUID LINE PRESSURE CHARGING METHOD IF INDOOR CONDITIONS ARE ABOVE NORMAL TEMPERATURE AND HUMIDITY.

1. READ AND RECORD OUTDOOR AMBIENT AIR DRY BULB (D.B.) TEMPERATURE ENTERING CONDENSING UNIT.
2. READ AND RECORD VAPOR LINE PRESSURE AND TEMPERATURE AT THE SERVICE VALVE (LARGE VALVE) OR SERVICE PORT AT COMPRESSOR.
3. FROM THE TABLE BELOW, THE READING AT THE INTERSECTION OF VAPOR PRESSURE AND OUTDOOR AMBIENT TEMPERATURE SHOULD COINCIDE WITH THE ACTUAL VAPOR LINE TEMPERATURE.
4. IF VAPOR LINE TEMPERATURE IS NOT THE SAME, ADJUST REFRIGERANT CHARGE.

   ADDING R-22 WILL RAISE VAPOR PRESSURE AND LOWER VAPOR LINE TEMPERATURE.

   REMOVING R-22 WILL LOWER VAPOR PRESSURE AND RAISE VAPOR LINE TEMPERATURE.

   CAUTION: IF ADDING R-22 RAISES BOTH VAPOR PRESSURE AND TEMPERATURE, THE UNIT IS OVERCHARGED.
5. FIFTEEN TO THIRTY MINUTES AFTER ADJUSTING THE CHARGE, STEPS 1 THROUGH 3 ARE TO BE REPEATED AFTER VAPOR LINE TEMPERATURE AND PRESSURE HAVE STABILIZED.
6. SHOULD THE INTERSECTION OF THE VAPOR PRESSURE AND OUTDOOR AMBIENT TEMPERATURE FALL IN THE OPEN AREAS OF THE TABLES, THE FOLLOWING ARE LIKELY CAUSES:

LEFT OF NUMBERS

A. LOW INDOOR AIRFLOW.
B. LOW RETURN AIR TEMPERATURE.
C. LOW REFRIGERANT CHARGE.

RIGHT OF NUMBERS

A. GROSS OVERCHARGE.
B. EXCESSIVE AIRFLOW THROUGH EVAPORATOR COIL.
C. INDOOR CONDITIONS ABOVE DESIRED COMFORT LEVEL.

MODEL SERIES 10, 11, & 12 SEER

OUTDOOR AMBIENT °F	VAPOR PRESSURE AT SERVICE VALVE (LARGE)																				
	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84				
	VAPOR LINE TEMPERATURE AT COMPRESSOR - °F																				
ABOVE 100								43	45	46	47	49	50	51	53	54	55				
100							44	45	47	48	49	51	52	53	55	56	57				
95						45	47	48	50	51	52	54	55	56	58	59	60				
90						49	51	52	54	55	56	58	59	60	62						
85					52	53	55	56	58	59	61	62	63								
80				53	55	56	58	59	61	62	63	65									
75			55	56	58	59	61	62	64	65	66										
70		55	57	58	60	61	63	64	66	67											
65	57	58	60	61	63	64	66	67	69												

SYSTEM TOTAL CHARGE

INSTALLER

DETERMINE COMPLETE SYSTEM TOTAL CHARGE BY USING PROPER ITEM BELOW. STAMP OR MARK THIS VALUE ON RATING PLATE IN **"SYSTEM TOTAL CHARGE"** BLOCK.

"OUTDOOR UNIT CHARGE"
ADD PER FT. VALUE SHOWN BELOW FOR EACH FOOT OVER 25 FT. LIQUID LINE TO FACTORY CHARGE. SUBTRACT PER FT. VALUE SHOWN BELOW FOR EACH FOOT UNDER 25 FT. LIQUID LINE FROM FACTORY CHARGE.

.3 OZ. PER FT. FOR 1/4 OD
.4 OZ. PER FT. FOR 5/16 OD
.6 OZ. PER FT. FOR 3/8 OD
1.2 OZ. PER FT. FOR 1/2 OD
1.9 OZ. PER FT. FOR 5/8 OD

REPLACEMENT CONDENSING UNIT INSTRUCTIONS

If this condensing unit has been sold to replace another unit, and is for use in an existing system of equal capacity, we recommend using the following procedure for best results.

1. Cut off all power to the unit.
2. Remove refrigerant with appropriate reclaim recycle device. (Do not vent to the atmosphere.)
3. The installer should study the installation instructions supplied with each new condensing unit. All items are important, but careful attention should be given to the electrical and refrigerant line data tables.
4. Remove old condensing unit, retaining all of the original tubing and electrical wiring possible.
5. If the remaining portion of the liquid or vapor line contains a liquid or vapor line drier, remove and discard.
6. **If this new unit replaces one with a burned compressor,** careful attention must be given to cleaning the refrigerant lines, evaporator coil, and capillary tubes or expansion valve. With a capillary tube system, a vigorous purging with dry nitrogen through the vapor line out the liquid line (backward purge) will be helpful. If the evaporator coil is equipped with an expansion valve, either remove the internal cage assembly or the complete valve prior to purging with dry nitrogen. Also confirm that the expansion valve is recommended for use with R-22. If not, replace with a proper type valve.
7. Place the new condensing unit on the concrete base. Install a new liquid line filter drier in the original refrigerant liquid line external to the condensing unit. If replacing a unit with a compressor burnout, also install a vapor line filter drier in the vapor line. Secure the refrigerant lines to the condensing unit. Keep the service valves closed.
8. Pressurize only tubing and evaporator coil with dry nitrogen. Use sufficient pressure to assure an accurate leak test. Do not exceed the test pressures marked on the unit rating plate.

   WARNING: DO NOT USE OXYGEN TO PURGE LINES OR PRESSURIZE SYSTEM FOR LEAK TEST. OXYGEN REACTS VIOLENTLY WITH OIL WHICH CAN CAUSE AN EXPLOSION RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

   Leak test all joints using a liquid detergent. If leak is found, release pressure and repair.
9. EVACUATION: An evacuation of any system component that has been exposed to atmosphere or has lost its charge is essential before charging with dry refrigerant R-22. The procedure that follows applies normally to original evaporator and refrigerant tubing.

   CAUTION: Compressors should never be used to evacuate the air conditioning system. Vacuums this low can cause internal electrical arcing resulting in a damaged or failed compressor.

   a. Since the condensing unit itself will not have to be evacuated unless it has lost all its charge, leave the vapor and liquid line shut-off valves closed. See Step No. 7.

   b. Use a refrigeration type vacuum pump capable of evacuation to 30″ of mercury.

   c. Connect a gauge set to the vacuum pump and to both the vapor and liquid line service ports.

   d. Evacuate the tubing and cooling coil. The pressure gauge should read at least 29.5″ of mercury.

   e. The tubing and cooling coil will now be free of non-condensables and the liquid and vapor shut-off valves can be opened. Do not remove the manifold and gauge assembly, as it will be needed to balance the refrigerant charge.

      WARNING: THE BRASS VALVE IS NOT A BACKSEATING VALVE. OPENING OR CLOSING VALVE DOES NOT CLOSE SERVICE PORT. EXTREME CAUTION MUST BE EXERCISED NOT TO FORCE VALVE STEM AGAINST THE RETAINING RING. IF THE VALVE STEM IS BACKED OUT PAST THE RETAINING RING, SYSTEM PRESSURE COULD FORCE THE VALVE STEM OUT OF THE VALVE BODY AND POSSIBLY CAUSE PERSONAL INJURY. IN THE EVENT THAT THE RETAINING RING IS MISSING, DO NOT ATTEMPT TO OPEN THE VALVE.
10. There is a wiring diagram attached to the control compartment cover. Consult this wiring schematic and follow during the installation of the control and power wiring.
11. **CAUTION:** If the refrigerant is metered to the cooling coil by an expansion valve, the recommended size start relay and start capacitor must be correctly installed in the appropriate circuit. (NOTE: Units incorporating scroll compressors do not require start components.)
12. Clean or replace return air filters. Start the indoor blower with fan switch to "on" position and check air flow for correct CFM through the cooling coil.
13. Turn thermostat subbase switch to the cooling position. Operate the thermostat to call for cooling.
14. With the new unit in operation, balance the refrigerant charge after 30 minutes of running time with the use of the "SUPERHEAT CHARGING METHOD" or the "LIQUID LINE PRESSURE CHARGING METHOD" on the other side of this sheet.
15. Replace service port caps and valve stem caps. These caps must be tightly replaced to prevent leaks.
16. Leave the Use & Care Instructions with the home owner and advise the owner of the proper and necessary preventive maintenance.